

apex of the distal nectocalyx; and having run along the polype-groove as far as the fundus of the nectosac, where it was surrounded by a tubular process of endoderm, it also terminated in a bifurcation, the resulting branches being distributed to the upper wall of the sac, as in the former case.

Though the movements of *Diphyes* are very variable, the normal position is that in which the chaplet of polypes trails from the groove of the distal nectocalyx, the nectosac being superior or on the neural side.

The nectosacs give propulsion to the whole organism, with the pointed extremity of the proximal nectocalyx foremost; nevertheless I am disposed to think that the movement is truly retrograde, as in the case of the cuttlefishes; and if this be true, all the terms of relation used in the description of animals having a bilateral symmetry will be applicable to *Diphyes*.

H.M.S. 'Lord Warden.'
Gibraltar, Oct. 10, 1871.

XV.—*Note on Prof. Heller's Catalogue of the Hydroida of the Adriatic**. By the Rev. THOMAS HINCKS, B.A.

WE are indebted to Prof. Heller for very valuable contributions to our knowledge of the Invertebrate fauna of the Adriatic. In 1867 he published at Vienna an admirable Catalogue of the Polyzoa which occur in that sea, containing descriptions and figures of a large number of new species. In 1868 he continued his work, and dealt with the Zoophytes and Echinodermata of the same region, in the paper which is the subject of the present communication. The zoology of the Adriatic has been illustrated by a long line of able investigators, extending from the times of Donati and Olivi (1750–1792) to the present day; but Prof. Heller has shown us that its riches were far from being exhausted. It is unnecessary to say a word as to the value of such local catalogues and the relation which they bear to the interesting problems connected with geographical distribution. It is obvious, however, that, inasmuch as they form the storehouses from which the theorist draws his facts, it is of the first importance that they should be characterized by rigorous accuracy in the discrimination and identification of species. In that portion of his work which relates to the Hydroida, Prof. Heller has needlessly increased the chances of error, has rendered, indeed, a certain amount of

* "Die Zoophyten und Echinodermen des Adriatischen Meeres, von Prof. Cam. Heller in Innsbruck," 1868.

error inevitable, by his strange neglect of the later literature of his subject. He supplies us with a list of the authors, ranging from Donati in 1750 to Grube in 1864, who have concerned themselves specially with the fauna of the Adriatic; but of English writers on the Hydrozoa none are cited of later date than Johnston (1847); while there are but scanty references to the Continental and other works published since his time.

It is impossible that any treatment of the Hydroïda can be satisfactory which practically ignores the researches of Alder, Allman, Busk, Strethill Wright, and others in this country, who have cast so much new light on this department of zoology. In the hope of adding to the value of Prof. Heller's work, by supplying a few points that have escaped him, I venture to submit his Catalogue of Hydroïda to some critical revision.

The list is a small one for a district so fertile in other forms of animal life, embracing only thirty-seven species, of which twenty-three are included under the five genera into which Prof. Heller divides the *Sertularia* and *Plumularia* of Johnston. The most remarkable deficiency occurs in the Athecate or Tubularian section, under which only four species are recorded. About eighty species have been described from the British seas. It is highly improbable that this important group is not largely represented in the Adriatic; and I hope that Prof. Heller may have the opportunity of continuing his investigations, and giving us a more complete account of this interesting portion of his subject.

Of the four Athecate Hydroïds included in the Catalogue, one is recorded as the *Coryne pusilla* of Gaertner: this is an obscure species, which it is hardly possible to identify with certainty; and there is nothing to indicate to what particular form Prof. Heller applies the name. A considerable number of species of *Coryne* and the allied genus *Syncoryne* are now known, and to one of them Gaertner's name has been assigned; but, in the absence of all reference in the synonymy to later authors, it is impossible to decide which of these the Adriatic form may be. The brief account of it given by our author does not help us; for the characters which he ascribes to it are almost exclusively generic. At present, therefore, we can only affirm, generally, that one species of Corynoid at least is a native of the Adriatic.

The species included by Johnston in the old genus *Sertularia* Prof. Heller ranges in two divisions, for one of which he retains the latter name, and assigns to the other Lamouroux's name *Dynamena*. This arrangement, which is based

on the mode in which the calyces are disposed, whether alternately or in pairs, seems to me to be merely artificial, and not in any measure to represent the natural relationships of the forms in question. A well-marked group, of which *S. polyzonias* may be taken as the type, has been defined by Gray under the name of *Sertularella*; another, equally natural, characterized by the peculiar structure of the reproductive capsule (which is well exemplified in *S. rosacea*), has been constituted by Agassiz as *Diphasia*; a third, to which the Linnean name may be appropriated, will include the remaining forms, whether they have opposite or alternate calyces, a point in which the most closely allied species differ. Those which have the calyces in pairs may, for convenience' sake, be ranked as a subsection.

Sertularia Ellisii is amongst the species recorded in the Catalogue. It should be noted that this is the well-known and widely distributed *S. polyzonias* of authors, one of the most cosmopolitan of the Hydroida. Heller adopts the opinion of Milne-Edwards, that Ellis has figured two distinct species under the name of *polyzonias*; and also follows him in assigning the name *Ellisii* to the commoner of the two forms. It is unfortunate that the new name should have been given to the well-known species, while the old and classical designation has been reserved for a form which rarely occurs and has attracted little attention. In my 'History of the British Hydroid Zoophytes' (vol. i. p. 235) I have cited *S. Ellisii* as a synonym of *Sertularella polyzonias*; but, after a more careful examination of Ellis's figures and description, I am disposed to believe that Johnston was wrong in uniting them, and that the erect variety, with ovate calyces and a plain aperture to the gonotheca, is a well-marked species. At the same time I have never found it myself, nor have I met with specimens of it: but one of Ellis's figures is unimpeachable evidence; and variable as *S. polyzonias* is within certain limits, it never, so far as I am aware, makes an approach to the characters which he has so clearly represented in his figure B. Couch records both the forms as occurring on the Cornish coast, and regards them as specifically distinct (Cornish Fauna, p. 17). But, while accepting Milne-Edwards's species, I am strongly of opinion that the names should be reapportioned—that the more common form, which was probably the one known to Linnæus, should bear the older name (*polyzonias*), and that the one which Ellis was the first to figure should stand as *S. Ellisii*.

Dynamena (Diphasia) pinaster.—The specimens thus named, it is evident (from the description of the capsule and

the reference to Johnston's fig. 12, *c, d*, p. 72), should be assigned to *Diphasia attenuata*, mihi, a species which has occurred at Port Adelaide as well as on the British coasts. Heller seems to have met with the female gonotheca only, which he rightly describes as much attenuated below, and above covered with numerous spines.

Thuiaria lichenastrum.—This species is recorded by Olivi as a native of the Adriatic; but Heller considers it probable, from the description given of it, that the form intended should be referred to the *T. articulata*, Pallas. The *Sertularia lichenastrum* of Linnæus is closely allied to the latter; but Pallas, who had seen specimens from Ceylon exactly answering to Linnæus's description, considered the two forms distinct. It seems probable that the Adriatic species is identical with our British *articulata*.

The genus *Plumularia* Prof. Heller subdivides into three: he retains Lamarck's name for the *P. pluma* section, in which the nematophores ("Nebenzellen" of Heller) are developed only in connexion with the calyces, and the latter are approximate, and adopts Donati's *Anisocalyx* for the group in which the nematophores are generally distributed, the calyces comparatively distant, and long and short internodes alternate on the branches. For the section in which the shorter intermediate internodes are wanting he proposes a new genus, under the name of *Heteropyxis*. But the character relied upon as a generic distinction in this latter case is quite insignificant. Of the most intimately allied species (e. g. *Plumularia echinulata*, Lamk., and *P. similis*, Hincks), some possess the intermediate joint, and some want it. Of the two British species of *Antennularia*, *antennina* has it, but it is not present in *ramosa*. The difference is of the most trivial kind, and should have no place in a generic diagnosis, much less should it stand as the chief criterion of a genus. Nor can I agree with Prof. Heller when he adopts Donati's *Anisocalyx* for the group in which the nematophores are distributed over the stem and branches. The nomenclature of the Italian naturalist (who regarded the zoophytes as plants) has not obtained any currency in the literature of the Hydroïda; and the particular name in question seems to have had no reference originally to this section of the *Plumulariïda*, but to have been applied to certain forms belonging to the other group, of which the *Sertularia pluma* (Linnæus) is the type. Under these circumstances it seems to me better to retain the two well-known and widely used names of Lamarck and Lamouroux, *Aglaophenia* and *Plumularia*. Meneghini assigns the name *Anisocalyx* to a genus which he has founded for the *Sertularia secunda*

(Cavolini), a form which cannot be separated from *Plumularia* (mihl); while Costa ('Fauna di Napoli') seems to have applied it to the whole group. As it seems to me, it must either be retained for the *pluma*-section or abandoned altogether; and in the interests of scientific order I should adopt the latter course.

Under the genus *Anisocalyx* Heller records five species as found in the Adriatic; to these may be added the two which he has relegated to his new genus *Heteropyxis*, and also *Plumularia frutescens*, which he has wrongly associated with the *P. pluma* section. Of these eight species, four are regarded as new; they are distinguished from one another and from previously known forms chiefly by minute differences in the character of the internodes and the disposition of the nematophores. *A. bifrons*, Heller, comes very near *P. setacea*, Ellis, the chief difference being that in the former two pinnae spring from each division of the stem, in the latter only one. A single nematophore also is mentioned as occurring in *A. bifrons* above the calycle, whereas in the allied form there are two. The gonotheca is said to be oval or pyriform. The *Anisocalyx* (*Plumularia*) *setaceus* of the Catalogue does not appear to be identical with the British species of this name: it has only a single nematophore, which is described as "a rudimentary cell in the form of a small projecting denticle" placed in the middle behind the calycle, whereas the true *P. setacea* has two bithalamic nematophores above the calycle, one below it, and one on the intermediate joint. The gonotheca, too, is said to be "elliptical and smooth," which would certainly not be a satisfactory description of the elegant, flask-shaped capsule of *P. setacea*. If I am right in conjecturing that the Adriatic is distinct from the British form, I would propose for the former the name of *P. Helli*.

Another of Heller's new species is the *A. pinnatifrons*, which, judging from the diagnosis, comes very near the last. The *A. diaphanus* is more strongly marked, and is characterized by an ample development of nematophores, both on stem and branches. Of the two species of *Heteropyxis* recorded, one has the pinnae opposite, the other alternate; in all other points they seem to agree. As I have said before, these forms have no claim to be separated from *Plumularia* (mihl).

One other species of *Anisocalyx* (*Plumularia*) is included in the Catalogue, *A. secundarius*, which is identified with the *Sertularia secundaria* of Cavolini. As I have stated in my 'History of the British Hydroida,' there can be little doubt that this curious form is only a stemless variety of *Plum. Catharina* (Johnston) or some kindred species.

It appears, then, that in the Adriatic there is a considerable group of *Plumulariæ* distinguished from one another by comparatively slight differences, most of which have not hitherto been noticed elsewhere.

Laomedea dichotoma.—The description given of this species is not sufficient for identification; and in the absence of any reference to the later writers, who have most carefully investigated the Campanulariidae, it is impossible to decide what form is intended.

Laomedea gelatinosa.—The brief diagnosis and the reference in the synonymy to Johnston's plate xxv. figs. 3, 4, would seem to show that the Adriatic species to which this name is applied is the *Campanularia flexuosa*, Hincks. It is certainly not the *Laomedea (Obelia) gelatinosa* of Pallas.

Campanularia volubilis.—The *Campanularia (Clytia) Johnstoni* of Alder is, no doubt, the species intended. The description shows that it is not the *C. volubilis* of Linnæus.

To sum up, of the 37 species of Hydroida recorded by Prof. Heller as occurring in the Adriatic, two (*Corynæ pusilla* and *Laomedea dichotoma*) cannot be identified with any certainty; of the remaining 35, 18 are also found in the British seas. The list of species that are common to Great Britain and the Adriatic, as now revised, is as follows:—

Eudendrium ramosum.

Tubularia indivisa.

— larynx.

Halecium halecinum.

Sertularella polyzonias.

Sertularia abietina.

— operculata.

Diphasia tamarisca.

— attenuata.

Thuiaria articulata.

Antennularia antennina (?). [It is not improbable that *A. Ja-*

nini was the species recorded by Olivi under this name.]

Aglaophenia pluma (cristata), Heller).

— *myriophyllum*. I have this species also from the Red Sea.

Plumularia frutescens.

Obelia geniculata.

Campanularia flexuosa.

Clytia Johnstoni.

Lafoëa dumosa.

Of the foregoing, *Sertularella polyzonias* and *Sertularia operculata* are cosmopolitan species.

Of the remaining 17 species contained in Prof. Heller's list six are new, and so far have only been found in the Adriatic; and five of the six are referable to the genus *Plumularia*. The rest are known Mediterranean and Adriatic forms.

I hope that Prof. Heller may continue his researches, and give us a much fuller account of the Hydroid fauna of this interesting district.